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D T R O U T

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



August 19, 1939

Proportioned Grace

See page 118



A SCIENCE SERVICE PUBLICATION

Do You Know?

The Pharos of Alexandria, world-famous lighthouse, guided ships by its wood fire beacon for 1,500 years.

A protein powder extracted from whey, cheese by-product, can be whipped with water and used as a substitute for egg whites.

The longest straight and level stretch of highway in the world is said to be in Tennessee and Mississippi—33 miles without curves or grades.

A New York physician tells of working with three neighbors to clear a city lot of ragweed, and he suggests that hay fever victims could do a good deal in such ways to rid themselves of their misery.

The Burma route, which links southwest China with Mandalay, has been built by Chinese engineers over mountain passes, lakes, rivers, marshes, and forests—almost 1,000 miles of difficult engineering.

Since the water in which vegetables are cooked may have as much vitamin C as tomato juice, home economics experts advise chilling this vegetable water and serving it with a dash of lemon juice as an appetizer.

An ancient tomb recently found in southeastern Europe, in Georgia, contained a stone box in which were a Roman coin of Emperor Augustus' time, a silver buckle and belt ornaments, glass vessels and several golden plates from a burial wreath.

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QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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How does Mayo Clinic provide artificial noses for patients who have lost their own? p. 121.

ZOOLOGY

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Fashions in wood for furniture change, says the New York State College of Forestry, and right now favored kinds are red gum, oak, yellow poplar, birch and maple.

Makers of electrical hearing aids predict that such instruments will soon be worn as casually as eyeglasses, to aid children as well as adults who have hearing defects.

Washing eggs is not advised: water removes the "bloom" protecting the shell.

A traffic museum in Nuremberg, Germany, has probably the world's largest collection of model trains.

Radium in sea water increases with depth, so that there is almost 10 times as much at 1,300 feet as at the surface.

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OCEANOGRAPHY

Great Coral Reefs in Pacific Have Clams Four Feet Long

Pacific Science Congress Hears Report on Study Of Unusual Formations at Bottom of Ocean

CORAL reefs 1200 miles long, extending as far as 150 miles from the coast line, and sheltering huge clams four feet long and weighing more than a hundred pounds, were described by Prof. C. M. Yonge of England's University of Bristol, speaking before the Sixth Pacific Science Congress at Palo Alto, Calif.

"No ocean contains so rich a growth of coral reefs as does the Pacific," he told the Congress. "Fringing reefs bound the land within the tropics especially along its western shores and atolls are scattered far and wide throughout the South Seas. But the greatest coral formation of all is the Great Barrier Reef of Australia. This immense series of reefs extends along the northeastern shores of Australia from the tropic of Capricorn in the south almost to the shores of New Guinea in the north, for a total distance of more than 1200 miles. It is made up of thousands of individual reefs which extend in places as far as 150 miles from the coast."

Biology Studied

The biology of the corals which form these reefs was examined by the Great Barrier Reef Expedition, which worked for more than a year in 1928-29 on a small coral island midway between the outer reef and the mainland.

"Corals are essentially sea anemones which have acquired the power of forming massive limey skeletons," Prof. Yonge explained. Many grow to a great size, forming colonies which may be rounded and massive, branching and tree-like, or flat encrusting sheets, according to the region where they grow. Corals of the first type are found especially on the exposed outer surface of reefs, those of the second type in sheltered water in the lee of reefs, and of the third type on the summits of reefs where the surf sweeps over when the tide is out.

"Corals are all carnivorous. They feed, usually by means of delicate tentacles armed with batteries of stinging cells, on the minute animals which drift in the

surface waters. Most corals only expand by night when alone; the animal life is abundant near the surface.

"Within their tissues are contained countless numbers of minute plants called zooxanthellae. It had been thought that these contribute to the food of corals, but this was found not to be the case. They do automatically remove the waste products formed by the corals and in this way probably aid in the remarkable rate of growth possessed by corals. These can frequently double the bulk of their skeletons in six to twelve months, and it is this rapid growth which has made possible the formation of reefs many miles in length, of great depth and thickness, which are capable not only of resisting the destructive action of the Pacific breakers, but actually growing out against the full fury of the sea."

"Corals are among the most successful and most highly specialized of all marine animals and different kinds of corals are adapted for life in all regions of the reefs. On and in the reefs live an immense and diverse assemblage of animals and plants of all kinds and many, notably the fish, of great beauty. The most spectacular of all are the giant clams which may attain a length of more than four feet and which weigh more than a hundred-weight. These gigantic 'cockles' are the largest bivalve shellfish ever evolved."

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ENGINEERING

Cleaning Long Pipe Lines Is Strange, Tough Task

ONE of the strangest housekeeping jobs in the world is the task of cleaning the huge pipe lines which sprawl over much of the United States carrying gas and oil from the fields of Oklahoma, Texas and Louisiana to the great consuming areas in the midwest and Ohio River basin.

Twenty-four inches in diameter and even larger, the pipe-lines crawl up hill and down dale, under and over rivers



NOT CAMOUFLAGE

It is called a "scarifier," yet is not used to scare folks but for cleaning pipe lines.

carrying precious liquid and gaseous cargoes to markets.

Stretches of 1,200 miles of continuous pipe are no longer a novelty in the land. Over 300,000 miles of pipe are now in use.

When an overland pipe line for high-pressure gas transmission accumulates dirt, getting it out without tearing up the pipe is no mean task. Hundreds of pounds of mud, rust and dust may lodge in a section only a few hundred yards in length where the pipe dips down into a valley. In some known cases the carrying capacity of pipe lines has been reduced 25 per cent. by foreign materials.

Charged with cleaning the pipes is the "go-devil" and his related fellow the "scarifier." The latter is a strong, sturdy mean-looking device with 24 hardened steel blades that scour out caked dust and oily mud. Blown through the pipe in front of a blast of pressure of from 3 to 10 pounds to the square inch, the scarifier cuts into the slime and prepares the pipe for the go-devil.

The go-devil is a four-foot section of 12 and three-quarter inch pipe from whose sides projects row after row of steel "fingers" along the length of the core. At the tail end of the device is a

diaphragm made of heavy ditching machine conveyor belting for a tight fit with a thin, circular iron sheet back.

Materials loosened from the walls are blown out ahead of the cleaner through holes in the "nose" of the device.

Pushed by pressure the go-devil can travel with a speed of from 3 to 5 miles

an hour under ordinary conditions. Continuous sections of 5½ miles have been cleaned successfully.

Two trips with the scarifier and one or two trips with the go-devil make the inner walls of the pipe bright and shiny even in the low spots where accumulations are heaviest.

Science News Letter, August 19, 1939

AERONAUTICS

Patent Describes New Blind Landing System

Four Beams Are Used By New Method Which Gives Both Audible and Visual Signals to the Approaching Pilot

THE NEWEST blind landing system for aircraft, just granted a patent (No. 2,165,256) at the U. S. Patent Office, "talks" a pilot down to safety through four cigar-shaped, but invisible, radio beams that form a "funnel" leading down to the airport.

Invented by Clarence W. Hansell of Port Jefferson, N. Y., with patent rights assigned to the Radio Corporation of America, the new system provides a guide path in space formed by four sharply-directed radio beams.

When on the proper line the pilot hears only a buzz. If he is too far to the right he hears a voice repeating

"left-left-left." If too far up, the voice says "down-down-down." Similar "right" and "up" signals are given for incorrect landings that are too far off to the left or too far down.

Because the four beams are sent upward at low angles with one another the open end of the "funnel" is much larger than the other end which, of course, is a spot on the landing field.

The directions to the pilot can be either audible—as in the voice that repeats up-up, down-down, right-right, left-left, or they can be by visual means on an instrument in the cockpit.

Audible signals are perhaps prefer-

able, states the patent, because they leave the pilot's eyes free to search the fog-covered airport for first glimpses of the landing surface.

Other blind landing systems have quite intentionally gone over to instrument indications rather than voice signals, according to Washington radio engineers.

One method uses the interacting radio fields of two beams to provide a zone of equal intensity of signal that marks a horizontal line passing through the landing field. At the same time a third beam, properly pointed, provides a signal down which the plane can glide to a landing, in correct vertical orientation.

The Hansell system, in contrast, uses two beams to obtain this proper vertical line rather than a single one.

Science News Letter, August 19, 1939

BOTANY—GENETICS

Dean of Plant Explorers Honored With Medal

DR. David Fairchild, dean of America's plant explorers, is now decorated with the Meyer medal for plant introduction, a surprise tribute from the little group of men who search the world that our fields and forests may be enriched by crops and trees from other lands.

At the U. S. Department of Agriculture's plant introduction garden in rural Maryland, Secretary of Agriculture Henry A. Wallace handed Dr. Fairchild the bit of metal symbolizing the spirit of adventure and service of those who hunted vegetative immigrants fit for our continent.

Just 40 years ago Fairchild, now 70, came to Washington to pioneer the important work of plant introduction. The world became his garden. Many who worked with him in the years that followed joined in the Meyer medal ceremonies.

Many of the pioneers are dead, among them Frank N. Meyer, the USDA's first full-time plant explorer, lost at sea in 1918, who left a fund which makes possible the medal bearing his name. From China Meyer brought soy beans, the Chinese elm, and other living plants now very much at home in America.

Dr. Fairchild, now retired from government service, is still exploring for plants. He is planning another trip to the Spice Islands, sailing in a specially built Chinese junk.

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The first training school for teachers was started in the seventeenth century.



HONORED

Dr. David Fairchild, left, dean of America's plant explorers, is receiving the Meyer Medal for plant introduction from Secretary of Agriculture, Henry Wallace, with Mrs. Fairchild and P. Howard Dorsett, retired plant explorer, looking on.

ASTRONOMY

Collision Theory of Earth's Origin Is Exploded

Hot Gases Torn Out of the Sun Would Quickly Dissipate And Not Cool Enough for Condensation, Harvard Man Says

THE widely-accepted collision theory of the birth of the solar system, including the earth on which we live, as the result of a star sideswiping the sun ages ago was attacked by Dr. Lyman Spitzer, Jr., of Harvard College Observatory, before the American Astronomical Society meeting in Berkeley, Calif.

Hot sun gases drawn out into a gigantic filament by such a glancing encounter between stars would explode just as a deep-sea fish bursts when brought to the surface and released from the high pressure surrounding it.

No alternative theory of solar system origin was offered by Dr. Spitzer, but he suggested that the planets may have been formed during the general chaos accompanying the formation of the Milky Way galaxy two billion years ago.

"According to the encounter theory," Dr. Spitzer explained, "one star sideswiped the sun, or possibly it was a hypothetical former companion to the sun. A thick cigar-shaped filament of hot gas formed between the two stars, and condensed into planets as the stars separated.

"It was generally assumed previously that such a filament would cool sufficiently quickly to allow condensation. Present calculations rule out this possibility. Hot gases inside sun are at enormous pressures and temperatures; if torn out of the sun by passing star they would not be subject to such pressure and would explode just as deep-sea fish, normally under heavy pressure, explode when brought to the surface.

"Filament gases would reach the velocity of escape from the filament in a few hours. During this time filament would radiate less than a thousandth of its internal energy and hence could not cool appreciably. Since the filament would accordingly dissipate into space, a collision process could, therefore, not lead directly to formation of planets."

Discover Expanding Shells

EXPANDING shells of gas surrounding bright blue-white stars, rushing away from the star at the rate of 30 to

about 100 miles per second, were reported by Dr. Ernest Cherrington, Jr., of the Perkins Observatory, Delaware, O.

A close examination of visual-region spectrograms of Be and B stars revealed to Dr. Cherrington that a large percentage of stars with nebulous line had sharp lines also. The more familiar nebulous lines are formed in the usual surface or photosphere of the star, while the sharp lines are thought to be formed in the receding super-shell. The velocity of the expanding shell increases with increasing stellar luminosity. There is higher degree of excitation in the super-shell than in the photosphere, and the excitation in the shell declines with increasing luminosity while excitation in the photosphere increases.

Dr. Cherrington's preliminary results show that the pressure of an absorbing super-shell in a large number of B stars may be the fundamental cause of the limitation of brightness for high temperature stars.

Mysterious Luminous Bars

WHY SOME of the spiral nebulae, great galaxies of stars in outer space like our own Milky Way, have a luminous bar extending across their central portion remains an astronomical mystery, Dr. Edwin Hubble, of Mt. Wilson Observatory, told the meeting. About four-fifths of all the spiral nebulae are barred.

"In the fully developed barred spiral," Dr. Hubble said, "a luminous bar extends diametrically across the central lens, and spiral arms spring abruptly from either end of the bar. In all other respects, the two types of spiral appear to be strictly comparable, and to follow the same pattern of evolutionary development.

"Since the bars do not seem to be correlated with any other physical features, their origin is sometimes attributed to tidal action or other external forces. This interpretation, however, is not supported either by the orientation of the

bars with respect to neighboring systems, or by the distribution of the nebulae themselves."

Nebulae present a wide variety of structural forms but they fall naturally into an ordered sequence which presumably represents the evolutional history of stellar systems. Dr. Hubble is making detailed studies of the various stages, based upon photographs of about 2000 of the brighter nebulae made with the large reflectors on Mt. Wilson.

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ENGINEERING—GENERAL SCIENCE

Engineers' Inquiry Asks: Are Patents Suppressed?

SO IMPORTANT are patents to American industry that engineers and industrialists feel they have "a vital interest" in the American patent system, 150 years old next year. Suggestions for changes in the patent status quo are scrutinized with suspicion and care, regardless of where they originate.

The patent system, grinding out the 17-year monopolies of invention at the rate of some 40,000 per year, has been subjected to several recent inquiries and investigations. The Temporary National Economic Committee (monopoly investigation) under Congressional mandate dug into the patent problem as it stirred about for facts in several industries, notably glass and telephone service.

Now engineers and manufacturers are engaged in an inquiry of their own, asking engineers and inventors to volunteer recitals of their patent experiences. One objective of this volunteer testifying, sponsored by the National Association of Manufacturers, the National Industrial Conference Board, and the American Engineering Conference, is to discover whether there is any truth in the oft-repeated, and as often denied, accusation that valuable patents are bought up and laid on the shelf by selfish industries or otherwise suppressed.

Question 5 of the industrialist-engineer questionnaire asked about "any premeditated opposition from others to the working or use of your patents" for reasons not otherwise listed, which other reasons include: "No adequate market demand," "invention brought out ahead of opportunity for use," "awaiting commercial development," etc.

Another interesting question is: "What rewards or satisfactions, other than monetary have come to you through your patented inventions?"

And the inquiry also searches into the

legal fights that have tested the validity of the patents.

When the returns are in and digested, the report will make illuminating reading.

All who have been granted patents are being urged to respond to the inquiries.

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PHYSICS

New Experiments Make Water Flow Uphill

WATER is flowing uphill at the General Electric Research Laboratory in experiments studying the surface tension of liquids. When a cold glass rod, chilled in liquid air, is touched to the bottom of a thin glass slide, on the upper surface of which is a layer of liquid, a small mound of water piled up over the cold spot, reports Allen V. Hershey (*Physical Review*, July 15). By putting tiny particles of bentonite clays in the liquid the flow of liquid to make the mound can be traced. At the free surface the fluid is found to move toward the center of the mound while on the under surface it flows away from the mound. The surface tension forces make the liquid flow uphill.

Surface tension is the molecular force which makes liquid drops form into spherical shape. It also makes possible capillary action by which trees and plants get nourishment from the ground up into their leaves.

The new happening is related to the well-known but little-noted phenomenon of "tears" in strong wine. These tears can be found on the sides of a wine glass above the surface of the wine, where they form in seemingly mystical fashion and grow larger until they flow down again to the surface of the wine, Mr. Hershey reported.

Tears arise because there is a greater evaporation of alcohol from the wine at the rim of the glass than at the center. This lowers the temperature, increases the surface tension at the rim and continually pulls the wine slightly up the surface of the glass. There the wine forms into drops and falls back down as tears. The cold glass rod in Mr. Hershey's experiment likewise lowers the temperature and increases surface tension sufficient to make the liquid flow uphill.

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An alligator killed long ago by an Indian's arrow and a white man's musket ball combined was recently dug up near the San Antonio River in Texas.



SPACE FOR AIR

Eleanor Holm's grace in the water shows the art of the successful swimmer. Good swimmers have deeper chests and broader shoulders than poor swimmers, new scientific measurements show.

ANATOMY

What Makes A Girl Excel at Dancing, Swimming, Tennis?

Scientist With Calipers and Tape Measure Discovers Certain Physical Reasons for Success in Sports

See Front Cover

WHAT makes a girl a good dancer? You probably have your own ideas, derived from experiences under a mid-summer moon when the orchestra was "sending" its sweetest, or from a critical eye turned on Ginger Rogers or Mary Wigman.

A scientific eye has lately been turned on the subject and along with tape measure and calipers and other measuring instruments has given at least part of the answer to why one girl is a better dancer than another—or a better swimmer or tennis player or a star on her school basketball team.

The dancing in this case was not the jitterbug variety, although it is likely that the dancers—sophomores and juniors at five leading women's colleges—can hold up their end successfully in jitterbug activities as well as in the more classical forms of the modern dance. So far as this latter type of dancing is concerned, and perhaps it is true for other types also, the girl with long upper arms and long thighs is at a disadvantage.

Physical measurements of girls who were the best and the poorest in modern dance classes at Barnard, Goucher, Smith, Vassar and Wellesley showed

this. The findings and their significance have been reported by Dr. Elizabeth Beall, of Teachers College, Columbia University, New York.

Dr. Beall started her studies because she thought she might find information about girls which would be useful in guiding them into physical activities for which they were particularly suited.

"The emphasis today in physical education in women's colleges," she points out, "is on the adaptation of the program to the individual. Since enjoyment of physical activity is largely dependent upon the success gained in pursuit of it, it is of prime importance to know what factors are related to achievement. Physical educators have increasingly felt the need for more scientific evidence along these lines in order adequately to guide students in their selection of activities."

The relation between stature or body build and success in various forms of athletics has long been studied for men. The girls, apparently, have been rather neglected in this respect. Dr. Beall's studies do not furnish a basis for advising a girl to engage in one or another of the various activities on the basis of body build. She has found certain measure-

ments, however, which indicate that a girl will be more or less successful in a certain line of activity.

"The successful swimmers," she reports, "are heavier, have broader hands, hips and shoulders, deeper chests and a larger chest circumference than the unsuccessful swimmers."

This is perhaps what you might expect and Dr. Beall points out that it bears out the findings of two other scientists who have studied the problem, F. A. Schmidt and W. Kohlrausch, in their study of German men athletes.

Whether the extra weight the successful swimmers carried was due to larger bones, bigger muscles or more fat could not be told from Dr. Beall's measurements. Ability to float, she points out, is undoubtedly an advantage in swimming. Some authorities believe that this ability depends on fat and on the amount of air or gas in the lungs and other body tissues. The deeper chest and larger chest circumference found in the successful swimmers would give them a greater chest capacity with more room for expansion of the lungs and hence a greater volume of air in the lungs to increase floating ability. Ability to float would also be helped by the broad hips because

this would give a larger surface area and more soft tissue across the lower back. Broad hands give more area for resistance to the water which should help the swimmer pull or push her way through it.

Successful tennis players, Dr. Beall found, differed from the unsuccessful ones in only four measurements, as compared with the six significantly different measurements found in successful and unsuccessful swimmers and basketball players.

A long body and broad feet apparently are what a girl needs to be a tennis star, so far as physical measurements are concerned. The successful players were taller, both standing and sitting, than the unsuccessful ones. They had longer legs (both thighs and from the knee down) and broader feet. The broad foot helps maintain balance by giving greater leverage between the axis of inversion and eversion, Dr. Beall says. The long legs help the player to cover the court quickly, an important factor for good tennis playing.

Racket Aids Arms

You might think the tennis player would need long arms and big hands, but she does not, apparently, and the reason Dr. Beall suggests is that the racket adds to the arm leverage. The only difference between the successful tennis players and the good swimmers is that the swimmers have broader hips.

The star of the basketball team has longer arms, longer and broader feet and wider shoulders than the poor players. The entire length of the arm is important in this game, but the length of the hand is of even greater importance. This is probably because the 30-inch basketball can be caught more securely and handled more easily by a girl with a long hand than by one with a short hand.

For some reason not easy to explain, a long upper arm is more important to success in basketball than a long forearm. Greater length of arm, of course, makes it possible to reach a greater distance which helps decidedly both in catching the ball and in throwing it when closely guarded. Wide shoulders help by increasing the length of the arm as a lever and increasing the range of arm movement.

Longer and broader feet probably help the player keep her balance, which is important in a game like basketball involving a great deal of running and jumping with sudden stops and changes in direction.

When it comes to the modern dance, it is harder to figure out what physical

measurements help toward success, chiefly because it is hard to measure success in this activity objectively.

"Modern dance," Dr. Beall explains, "is an art which is concerned with the communication of ideas and feeling through rhythmic movement. The body is the instrument, movement is the medium of expression. Dance involves subjective motor activity, whereas basketball and tennis make use of movement to control an external object. This distinction made it more difficult to select the dance groups, since there is no objective way of determining dancing skill."

"Trunk swings, oppositional arm and leg movements and various types of falls and recovery are a part of dance technique. Long segments of the arms and legs may impede successful execution of this technique, especially in the case of recovery from a fall. It is more difficult for a person with long thighs to rise from the floor than for one with short thighs, because the center of gravity (the hips) is farther removed from the axis (the knees)."

Long thighs and long upper arms therefore are considered a disadvantage for the modern dance. These two measurements were the only ones in which Dr. Beall found a significant difference between the good and poor dancers and it was the girls with the long upper arms and thighs who were found in the unsuccessful groups. Three other measurements were almost significantly different: weight, length of entire arm and chest circumference. The good dancers were just a bit lighter in weight, their entire arms were just a little shorter and their chest circumference a little less.

In the cover illustration of this week's SCIENCE NEWS LETTER, Evelyn Davis, Washington, D. C., dancer, typifies the grace characteristic of the modern dance. Fremont Davis, Science Service staff photographer, took this action picture.

Not the Only Factor

These physical measurements, Dr. Beall points out, are of course not entirely responsible for a girl's success in sports or dancing. They may not even be the most important factor, though it would seem that they do play an important part.

Temperament, skillful brain and nerve work in directing muscles for efficient action, heart function and such other physiological qualities as chemical changes in the blood and tissues all contribute to success in athletics and the dance, as does proper technique.



COVERING COURT

Tops in tennis grace, and one of the world's best woman players, is America's Alice Marble. Good tennis players, says scientist, need long legs to cover the court. Broad feet help too for balance.

INVENTION—ETHNOLOGY

Diesel Engine Principle Invented By Malays

THE COMPRESSION ignition principle of the Diesel engine was invented by Malay natives at least a thousand years before it was invented in Germany.

Herbert W. Krieger, U. S. National Museum curator of ethnology, supports this claim by showing one of the old high-compression fire lighting gadgets of the Malay Peninsula, considered probably the most efficient fire making idea that primitive men ever thought of. It is a tightly wrapped plunger which is forced into a wooden cylinder by a blow of the hand. At the bottom of the cylinder is a bit of tinder, which lights when the blow compresses the air in the cylinder, thereby generating heat.

Crediting primitive men with other brilliant inventions, Mr. Krieger says that the textile industry was saved millions of dollars of royalties when an invention for winding cord so that it could be unwound with even tension turned out to be similar to an old Fiji idea. A Fiji twine ball, in the National Museum, prevented patenting of the device.

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CHEMISTRY

Speedy Progress on Vitamin K Chemistry

STEADY progress has been made by scientists working at the chemistry of vitamin K in the hope of making it available in pure form. This is the vitamin which controls bleeding in one kind of jaundice and which may prove a life-saving remedy for infants threatened by a dangerous bleeding disease of the newborn.

When the anti-bleeding power of the vitamin for certain kinds of jaundice was discovered, patients had to be given it either in doses of alfalfa or in doses of fish meal—neither very palatable nor easy for sick people to take, and practically out of the question for week-old infants.

Crystals of the vitamin, which could be made into pills or dissolved in water, was what the scientists were after, and it now appears that the goal has been reached.

From St. Louis University School of Medicine comes the announcement that the vitamin has been isolated in pure crystalline form. The research team which achieved this consisted of Drs. S. B. Binkley, L. C. Cheney, E. A. Doisy,

D. W. MacCorquodale, R. W. McKee, and S. A. Thayer. Besides obtaining crystals of vitamin K from alfalfa and fish meal, these scientists have discovered its chemical structure and made synthetic chemicals with vitamin K activity. These chemicals are the kind known as quinones.

Almost simultaneously with the announcements from St. Louis came word from California that phthiocol, crystalline material which gives the tuberculosus germ its color, has vitamin K's anti-bleeding action.

All of this has come within the five years since Dr. H. Dam, of Copenhagen, and Drs. H. J. Almquist and E. L. R. Stokstad, of the University of California, announced almost simultaneously the discovery of this vitamin as an essential diet factor for protecting chicks from a fatal bleeding disease. Use of the vitamin for humans threatened by fatal bleeding in certain conditions was first announced in 1938 by Drs. H. R. Butt, A. M. Snell and A. E. Osterberg of the Mayo Clinic.

Science News Letter, August 19, 1939

MEDICINE

Electrical Shocks Restore Failing Blood Circulation

SHOCKING a patient by electrical means is a promising treatment for failing circulation of the blood hailed by the *Journal of the American Medical Association* editorially. (Aug. 5)

Many a surgeon has watched a patient sinking into traumatic shock and many a physician has observed a patient exhausted by illness, the editorial explains, only to find there is some element in the mechanics of blood circulation beyond medicine's control.

Now Drs. G. G. Ornstein, Sidney Licht, and Myron Herman of Sea View Hospital, New York City, have reported a method of raising venous pressure in case of shock, particularly applicable to circulation failure under spinal anesthesia. Towels soaked in salt solution are wrapped around the patient's body and legs. Electrodes are connected and an induced electric current is applied. This causes a distinct rise in pressure of blood in the veins.

The original suggestion that low blood pressure arises from a failure in the tonus of the body's muscles which lowered the gentle pressure sending blood from the tissues into the veins and back to the heart came from Prof. Yandell Henderson and his group of investigators at Yale.

Science News Letter, August 19, 1939



GENERAL SCIENCE

Scientists Pool Resources In \$60,000 Research Plan

TO PROBE uncharted borderlands between the sciences, biologists, physicists, and chemists will start work on a two-year cooperative program of research in University of Pittsburgh laboratories, financed by a grant of \$45,000 by the Buhl Foundation supplemented by \$15,000 from the University.

Aims of the research include such basic problems as discovery of the nature of chemical changes within living cells, fundamentals of animal and human nutrition, more complete understanding of how complex animal bodies develop from single egg cells and study of the new artificially radioactive or "exploding" elements that can be used to trace the way in which various substances are utilized in the body.

The lone wolf scientific worker in his laboratory may be a romantic picture, but his method is wasteful, declared Dr. C. G. King, University of Pittsburgh professor of chemistry, chairman of the committee to coordinate the research. Pooling of equipment and knowledge is expected to be particularly valuable in the new experiments, as both physical and biological sciences are involved.

Science News Letter, August 19, 1939

ZOOLOGY

Animals Have Aliases; Do You Know These?

ALIASES among the animals: What is popularly called a gopher in the Chicago area is really a ground squirrel. In Florida, a turtle goes by the name of gopher. The real gopher (a mammal) is called a salamander. The true salamander is called a "Congo eel." Surprise! Floridians actually call real eels, "eels."

Our robin isn't, it's a thrush. The real one is a small British bird with red breast. The ground-hog is no relative of the pig; it's a ground squirrel or wood-chuck. The black bass is a sunfish, not a true bass. The big-mouthed bass is called a trout in the south. The sea trout is charr in Labrador and a croaker along the south Atlantic coast. Authority: Field Museum of Natural History.

Science News Letter, August 19, 1939

SCIENCE FIELDS

AGRICULTURE

First Perennial Wheat Is Claimed by Russian

THE WORLD'S first perennial wheat is claimed by Soviet scientist Tsitsin, who crossed wheat with couch-grass. In south Russia, there are two grain harvests a year; farther north, one crop of grain and one of fodder. The grain is much more bushy than ordinary wheat, its root system is deeper. Two potato harvests in one summer are another Soviet demonstration. Young tubers of the spring harvest, treated with a 2% ethylene-chlorohydrin solution, are planted in July for the fall crop. Authority: Tass, official Soviet news agency.

Science News Letter, August 19, 1939

METEOROLOGY

New Code Reports Weather by Numbers

FOUR times daily the teletype printers and telegraph clickers at the nation's central Weather Bureau in Washington break out into a rash of activity and start sputtering such messages as this: 55318 28200 32940 28/// 00195 65711 3650 LIGHT.

Packed into that brief message, that comes through at the lowest rate because it has less than ten units, is the complete picture of the weather and meteorological conditions at weather station 553 which is Omaha, Nebr.

The message is a sample of the weather Bureau's new numerical code for reporting weather from all over the United States and its possessions which has just been put into effect after fifty years of using over 10,000 code words to describe weather in telegraphic communication.

By the numbers code it is possible to report 99 different kinds of weather, 16 wind directions, more than 50 types of precipitation, about 30 kinds of clouds, about 10 degrees of wind velocity and visibility and such other information as barometric pressure, temperature and all the other factors which a forecaster needs to draw his national weather map.

Here is what the Omaha message means to the forecaster: Clouds covered less than one tenth the total area of the

sky and the visibility was 12 miles. The wind was light from the northwest blowing less than seven miles an hour. The weather at the time of observation was clear. Pressure was 1032.9 millibars and the temperature was 40 degrees Fahrenheit. The dew point temperature was 28 degrees Fahrenheit. Of clouds in the lower and middle levels there was none. High clouds of the fine Cirrus type were observed to the southwest. The ceiling was unlimited. In the preceding 12 hours a fine drizzle occurred which amounted to .11 inches of precipitation. The minimum temperature of the preceding six-hour period was 36 degrees and the maximum 50 degrees Fahrenheit. A light frost had occurred during that time.

By actual count it has taken 130 words to describe what the telegram, in code, packed into eight words.

Science News Letter, August 19, 1939

ASTRONOMY

Famous Woman Astronomer Finds 10,000th Variable

DR. ANNIE JUMP CANNON, one of the world's foremost women astronomers and a pioneer in variable star research, has discovered the ten-thousandth variable star found at Harvard Observatory since search for them began in 1863. The star, known simply as HV10,000, is a faint, fluctuating star in the constellation Sagittarius.

In all some 17,000 variable stars are known. Studies of them are valuable not only to reveal clues to the mysteries of the stars themselves, but also as keys to other secrets of the heavens. Dr. Harlow Shapley, director of the Harvard Observatory, for example, uses the so-called Cepheid variables as a yardstick of the universe.

Indicative of the rapidly increasing rate at which Harvard is now tabbing stars of this type is the fact that the first 35 years of Harvard's search yielded just 100 new variable stars, an average of about three a year. By 1931, when number 5,000 was discovered, the rate had increased to 150 a year and today Harvard is finding them at the rate of 625 a year, better than one a day.

Harvard is now engaged on the most intensive and comprehensive study of such stars ever undertaken, surveying the 300 known variables brighter than eleventh magnitude. The program, financed by Harvard's Milton Fund, entails 5,000,000 observations on more than 200,000 plates.

Science News Letter, August 19, 1939

SURGERY

Rubber Used by Mayo Clinic To Make New Noses and Ears

PATIENTS who have lost an ear or a nose because of cancer, other diseases, or accidents, can have new ones that defy detection made from latex, the pre-vulcanized liquid rubber of modern industry.

The new latex spare parts, necessary not only to restore the patient's appearance but to enable him to make a living, have been used on a number of patients at the Mayo Clinic. Dr. A. H. Bulbulian, director of the Museum of Hygiene and Medicine, has just reported to fellow physicians the details of his method of making these latex spare parts.

The new noses can be held in place either by spectacle frames to which they are attached, or by small quantities of a liquid adhesive solution. They may be used temporarily, until the plastic surgeon can make a new nose or ear from the patient's own skin, and tissues, or they can be used permanently by patients whose age or financial condition makes plastic surgery inadvisable.

The ideal material for such spare parts, Dr. Bulbulian says, has not yet been found. Latex, however, when properly compounded and manipulated, has "a much wider range of possibilities as to form, color, texture and durability" than other materials so far tried. Within the past year Dr. C. D. Clarke of Baltimore, Md., has also recommended this rubber material for this purpose.

Science News Letter, August 19, 1939

PUBLIC HEALTH

Germicidal Light Curtains Available for Homes

INVISIBLE curtains of germ-killing light are the latest protection against the spread of disease available to hospital and home. They are synthetic super-sunbeams shining a death ray barrage for air-borne germs.

Sun lamps commonly used produce the effect of the tanning, vitamin-D-creating sunshine. The germicidal lamps broadcast another ultraviolet wavelength, number 2537. Tiny tubes using only 3, 5 or 15 watts of electrical energy can lay down a curtain of germicidal radiation over a cabinet, doorway or an alcove entrance. Similar lamps serve as sterilizing auxiliaries in operating rooms, doctors' offices and even restaurant kitchens.

Science News Letter, August 19, 1939

ARCHAEOLOGY

Prehistoric Ellis Island

On Alaska's Northwest Tip Scientists Are Digging Up Evidence of America's First Big Immigration Problem

By EMILY C. DAVIS

THE ELLIS ISLAND of prehistoric America is being rediscovered.

With that sentence, you are whisked off to the northwest corner of Alaska. And you are way back in imagination in a time before the New World cared how many immigrants, refugees, or summer visitors landed on its shores.

Nobody cared then, unless one group of roving newcomers trod on the toes of another group; and there followed a personal battle. But now, archaeologists are investigating those early unofficial arrivals, and with far more persistence than any immigration official ever trailed a stowaway.

Fortunately for scientific detectives, the frozen ground of the Arctic has preserved quantities of evidence where one type of pioneers settled. These are the Eskimos.

Eskimos may not have been first to discover America. Probably they weren't. The first straggling groups of Asiatic hunters, who crossed Bering Strait from Siberia and kept moving until they and their children spread over North and South America, left very little behind them, anywhere, except stone blades and the bones of game animals they polished off.

But the Eskimos, by choice, or necessity, settled down in the Arctic and stayed right there living an Ice Age existence. No following the sun for them. They specialized in making a living in the North, and invented some remarkable gadgets for comfort and efficiency.

"New York"

One of the biggest settlements of prehistoric Eskimos is now being investigated by an archaeological expedition. Here, comparatively speaking, was a New York of early America, north of the Arctic Circle at Port Hope, about 200 miles north of Bering Strait where most of the early immigrants came over.

To dig out this New York of the Arctic, young Helge Larsen of the Danish National Museum has come all the way from Copenhagen to join forces with F. G. Rainey of the University of Alaska. The settlement they are excavat-

ing is a sand pit that is being washed away rapidly on one side while the other is being built up. From the advancing sea they are rescuing buried homes and trash heaps that reveal a strange pioneering life in the New World.

Raiding the Arctic icebox in this way is no easy adventure. Even in mid-summer the ground is so hard that excavators can dig only a few inches down in a day. Then they strike literally frozen earth and have to wait until the summer air thaws the exposed layer.

Objects recovered have to be "defrosted" speedily and with expert care so that they will not warp or fall apart. But from this cold storage the investigator, if he is careful, brings back wood, leather, and feather articles that have been preserved for centuries.

In ancient Eskimo settlements that have not frozen up, the rubbish heaps and houses yield none of these perishable antiquities. Even ivory may disintegrate, if not saved by freezing, and then little more than stone lamps and stone tools can be salvaged.

Against Time

Digging against time each summer because the ground freezes solid for winter by mid-September, and working in company with chill wind, rain and mosquitoes, scientific explorers are nevertheless wresting so much evidence from the frozen North that the prehistoric Eskimo can no longer be rated a forgotten man.

The surprising revelation that the oldest articles dug up in the Alaskan Arctic are the most beautifully made and decorated is the result of summer after summer of digging by Henry B. Collins, Jr., of the Smithsonian Institution in Washington.

Mr. Collins now divides Eskimo prehistory into four periods. The Golden Age of the Eskimos came first. These people were prosperous and happy in the New World, and they made even everyday harpoon heads and knife handles beautiful. Using fossil ivory they carved delicate scrolls and circles, achieving a fine art of their own.

Then came an Eskimo depression. The era that could produce Eskimo Raphaels and Michelangelos was over. People had

less time for carving beautiful designs, and they became satisfied with plainer harpoons and knife handles. Eskimos never again rose to their ancient heights of artistry and inventiveness, says Mr. Collins. Modern Eskimos turn out cribbage boards, paper knives and toy animals with skillful fingers for the tourist trade, but they do not create like the old masters.

Finding that the oldest Eskimos were living specialized lives, adapted for Arctic efficiency, at a very early time, Mr. Collins has concluded that they brought a good deal of inventive genius and art talent from the Old World with them.

Began in Siberia

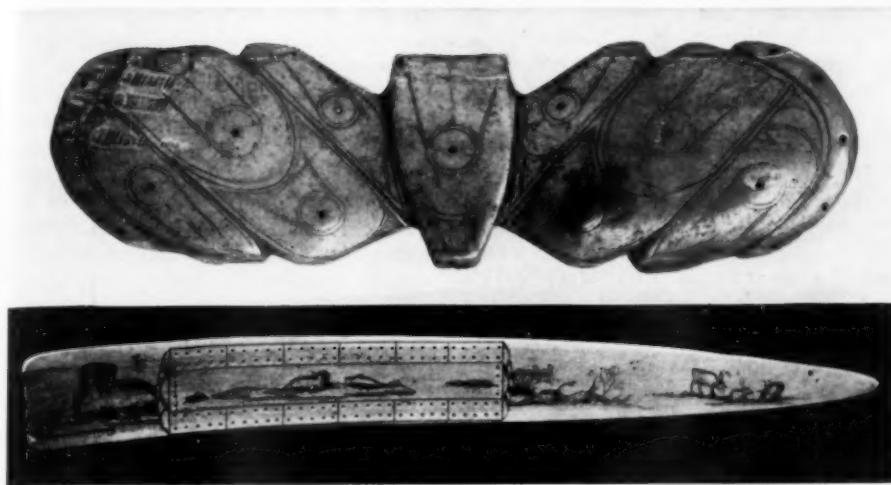
To understand the Eskimo immigrants into prehistoric America, it is necessary, he believes, to trail them back into Siberia. They began to be Eskimos over there. As added reason for thinking this, Mr. Collins says that all the basic features of their living, such as toboggans, harpoons, lamps, skin boats, and semi-underground houses, are found in the Far North across Asia and even as far away as Europe.

How the prehistoric groups of immigrants found their way to the New



NORSE INFLUENCE

This little doll made by the Eskimos is dressed in Norse clothing.



LOST ART

Eskimos today turn out handy pieces of work for tourists, such as the cribbage board shown here, but they cannot duplicate the delicate and graceful art work of the ancient Eskimos (above).

World has been explained by scientists, and even tried out by chance in native fashion by a schooner captain, who had to make the crossing. The immigrants, who had no idea they were doing anything so adventurous as crossing from an Old World into a New, must have come mainly via Bering Strait. The Strait is narrowest at Cape Prince of Wales, and with the Diomede Islands as stepping stones, the 50-mile gap could easily be navigated by people in simple boats. In winter, it could be crossed by wanderers afoot, over the ice. Modern Eskimos have done it if they had to.

It was this crossing that Capt. Max Gottschalk of Nome tried in a native manner. He left East Cape, Siberia, in early spring, with a sled loaded with food and with sixteen dogs, heading for Cape Prince of Wales by journey across the ice. He thinks back on it now as a perilous trip. At times the ice was paper thin. Currents carried him with the floe 70 miles up the coast beyond the place where he intended to land.

Ancient Perils

On Little Diomede Island, he picked up a white man who wanted to hitch a ride to the mainland. Twenty-five miles out on the floes, this fellow traveller fell through. Capt. Gottschalk quickly wrapped him up, put him in the sled and took him back to the island village. But the shock of the fall and the 20 below zero cold were too much for him, and he died there.

Going on alone, Capt. Gottschalk completed his journey, which had taken over nine days, and had duplicated no doubt

the same struggles and dangers that beset many of America's ancient arrivals.

There were emigrants leaving America, as well as people who wanted to come in, even in prehistoric times. Some archaeologists, who are investigating this, think the two-way traffic may have followed different routes. Mr. Collins believes that while most of the immigrants arrived via Bering Strait, there was a return route to Asia farther south over the Aleutian Islands, which swing out in a long chain from Alaska toward Kamchatka.

Two-Lane Traffic

As clues to this ancient west-bound traffic, Mr. Collins says that over in Kamchatka the natives used stone lamps and wore labrets as lip ornaments and made houses that were entered through the roof. And these, he declares, were fashions used earlier in America, so they must have been ideas exported to Asia by some of the early emigres.

But why not suppose that these American emigrants had gone back across Bering Strait, the way they or their fathers came? Because, explains Mr. Collins, these fashions that occur in Alaska as far north as the Aleutian Islands and also on the opposite shore in Kamchatka, were not found, originally, further north either in Asia or America.

As archaeological detective evidence goes, it makes a good case for two distinct traffic lanes.

In the course of centuries, some Eskimos wandered eastward across Canada. Some reached Greenland, becoming its first Eskimo inhabitants. Dr. Therkel

Mathiassen, who is the chief archaeologist of the Danish National Museum, has worked out in remarkable detail the succession of happenings in this land far from the Alaskan base.

These Eskimos who settled in the East were the first New World natives to meet white men. The New World's first wars of conquest were fought in the Arctic a hundred years and more before 1492, it has been learned by excavations. Norsemen attempting to get a foothold in Greenland had to fight it out with the Eskimos, and when the battle became serious, the Eskimos won.

This forgotten story of American warfare was one of the discoveries made by Dr. Mathiassen, when he excavated an Eskimo village on an island off northwest Greenland. He found with the Eskimo things, relics belonging to Norsemen. Some of these were a carved Eskimo doll represented wearing medieval Norse dress, and a bone chessman converted into a top. And a piece of a churchbell, used as a hammer! The Norsemen, declared Dr. Mathiassen, certainly did not break up their churchbells voluntarily so that Eskimos might make hammers and eardrops out of the pieces.

Peace at First

Like the Indians, the Eskimos did not start fighting white men in earnest, at first. Eric the Red discovered Greenland in 985 A. D., and Norse colonies were soon planted there. But it was over 200 years, strangely enough, before these white settlers in Greenland saw their first Eskimos.

Dr. Mathiassen explains this by saying that Eskimos stayed in the more northerly regions of Greenland, where the land was suited to their ice hunting and travel by dog sledges.

But then, Eskimos sighted white men. Advancing to investigate this curious invasion, they were presently involved in battles. By the fourteenth century, the war was in full swing, with Norse settlers being massacred and their homes burned with vengeful thoroughness.

Whether the European colony was actually wiped out by determined and victorious Eskimos, or whether some survivors turned Eskimo, marrying with the natives, is being fought out with words, in scholarly circles today.

Some scientists are strongly convinced that the ill-fated colony lost touch with the homeland in Europe, became malnourished on Eskimo food, caught the Black Death raging in Europe, and thus weakened could not meet the Eskimo attacks. Other scientists think that some

white men and women survived the first international war on American soil and turned Eskimo, and that their survivors may be seen today among the fairer Eskimos of Greenland.

Explorer Vilhjalmur Stefansson in his new book, "Unsolved Mysteries of the Arctic," declares that "the question of whether the European colony disappeared by extermination or amalgamation threatens to become an absurdly nationalistic issue." Most Danes favor the extermination theory; Norwegians favor amalgamation.

Stefansson himself provides ammunition for the amalgamation faction. He argues: A plague would have weakened Eskimos no less than the Norse settlers. Malnutrition would hardly have stricken Norsemen if they fell back on the diet on which Eskimos thrived; but on the contrary a mixed diet of imported food, and meat handled in the European manner, might have brought about diet deficiencies. And long-ago observers who reported that the Norse had been wiped out may have misunderstood what they saw. One party saw, in fact, merely a deserted farm of the settlers, and believed them dead; whereas, it may have been that they were off hunting caribou or catching salmon. But the silence of the farm seemed ominous, and the party sailed away to report general tragedy.

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Science News Letter, August 19, 1939

PUBLIC HEALTH

League of Nations Helping Chinese To Fight Plague

THE CHINESE Government is getting aid from the League of Nations in its fight against plague, cholera, malaria and other epidemic diseases, the League's Health Organization announces.

Experts in the fight against plague and cholera are now working in the northwest and center of China, reports Dr. M. D. Mackenzie, who has just returned from China where he has helped arrange for League assistance to the Chinese Government. The League has established a transport service to provide these experts with the stores they need for the fight against plague and cholera.

Health conditions on the road to Burma, China's lifeline at present, are under the supervision of a League expert who is serving as technical adviser to the Chinese Government. Malaria is particularly malignant in regions traversed

by this road and constitutes a serious menace to the transport workers, the road menders and the regions to which the road leads. Much of the work of the medical and engineering experts has been concentrated on this road, at the request of the Chinese Government. One of the League engineers is responsible for supervising the upkeep of the road, particularly during the rainy season which lasts from June to November.

Considerable quantities of medical and

sanitary stores have been provided by the League for China's anti-epidemic campaign. Besides quinine, these include several tons of chloride of lime for disinfecting wells in cholera-infected areas, several million doses of cholera and smallpox vaccines, equipment for 30 mobile bacteriological laboratories, and the necessary drugs for treating cholera, dysentery, relapsing fever and similar epidemic ailments.

Science News Letter, August 19, 1939

ENGINEERING—AGRICULTURE

New Soviet Tractor Performs Twenty-Two Operations

A NEW kind of electrical tractor that cultivates hotbeds mechanically with increased yields is being demonstrated on a large hotbed area of agricultural exhibition grounds in Moscow.

Invented by Vagan Mkrtchian, the new hotbed combine performs 22 different operations, according to a Tass report.

It is a small machine that looks somewhat like an old-fashioned limousine. It moves along the hotbeds from one row to another, opens their glass frames as it approaches and closes them again when it moves on. The operator manipu-

lates several levers in his cab, and the machine performs the various processes of cultivation and sowing in the hotbeds.

It brings soil to the hotbeds, scatters and levels it, marks out the rows, sows vegetables, waters them, weeds, adds fertilizers, sprays chemicals, pollinates plants, etc.

The design of the machine is very simple. Its metal frame is equipped with levers which open and close the glass frames, thus ventilating the hotbeds. Special tanks are mounted for water, mineral fertilizers and spray liquids.

In autumn and early spring when no



NO BREAKAGE

This tractor in the greenhouse is on legitimate business. It is mechanizing the cultivation of greenhouse plants in the Soviet.

watering is needed, the tanks are replaced by a conveyor belt for manure, soil, snow, etc. Attached to the combine are special devices, including a soil lever, a row marking and sowing machine, a cultivator, a machine for earthing up, a harvesting platform and a special attachment for the production of naphthalene gas to combat field pests.

The combine is propelled by a 3-kilowatt electric motor. Mechanized cultivation is claimed to raise the harvest yield in the hotbeds by 40 to 80 per cent. It takes the combine eight hours to till 2.6 hectares (6½ acres) of hotbeds and one minute to sow an area of 36 square meters (43 square yards).

Production of the new combine was started this year.

Vagan Mkrtchian got the idea of such a machine while he was engaged in hotbed farms in Armenia. It took him three years to design and develop it. At present Mkrtchian is a scientist on the staff of the Scientific Research Institute of Vegetable Gardening in Moscow.

Science News Letter, August 19, 1939

CHEMISTRY

United States Leads World In Chemistry; Germany 3rd

LEADERSHIP in chemistry throughout the world is now in possession of the United States, it is disclosed in a report submitted to the American Chemical Society by Prof. E. J. Crane of Ohio State University, editor of *Chemical Abstracts*.

Germany, which ranked first during the World War period and even a decade ago, has now dropped to third place with Great Britain second. Russia and Japan show striking gains, Prof. Crane reports.

English is predominantly the language of science, the United States and England accounting for 40 per cent of all scientific periodicals published.

The report is based on an analysis of 65,000 abstracts of chemical discoveries reported last year in *Chemical Abstracts*, Prof. Crane explained.

Chemical patents account for much of the leadership of the United States. During the last five years U. S. chemical patents have increased 15 per cent in number over the preceding five years. During this same time British chemical patents have declined 12 per cent, French chemical patents have decreased 23 per cent and German chemical patents have dwindled 30 per cent of their former number.

Science News Letter, August 19, 1939

PHYSICS

New Way To Separate Isotopes Is Quick and Effective

Combination of High Speed Centrifuge with Chemical Fractionating Column Method Reported by Virginians

A NEW way of separating isotopes quickly and effectively is suggested by Prof. J. W. Beams and Dr. C. Skarsstrom of the University of Virginia. (*Physical Review*, Aug. 1)

The new method would combine the whirling properties of high speed centrifuges with the chemical fractionating column method employed by Prof. Harold C. Urey, Columbia University Nobelist.

Isotopes are the forms of chemical elements which have chemical properties so similar that ordinary chemical methods will not separate them. Yet they have slightly different atomic weights.

Separating isotopes is one of the major tasks of physicists these days for isotopes can be employed as "tracers" in studying the physiological happenings of the human and animal body and have already contributed much to knowledge of hitherto obscure body processes.

To operate the new method would require a huge centrifuge, weighing tons, for the columns used at Columbia by Prof. Urey are two stories high. An apparatus to whirl them around in a supercentrifuge would be very large.

Search for Neutrino

In the same issue, Drs. H. R. Crane and J. Halpern of the University of Michigan describe their latest search for the elusive and never-found atomic particle, the neutrino, which is believed to have the mass of an electron, without electrical charge.

By bombarding chlorine with deuteron particles from the huge Michigan cyclotron, the scientists have made it emit electrons, or beta rays. Studying the pictures of these beta rays in a Wilson cloud chamber has shown that the ordinary, every-day laws of classical momentum are not observed unless one assumes that another particle (the neutrino) is liberated in the process.

Because of the neutrino's neutral character actual pictures of its tracks have not been obtained, and probably they will never be found. But the scientists

have found relationships showing definite directions in space in which the change of momentum occurs. This they interpret as the line of direction of the neutrino.

Split Uranium Atoms

NEW attacks on the secrets of uranium splitting — potential source of atomic power if scientists can ever find out how to create it efficiently and then control it after they have it — were described.

Nobel Prof. Enrico Fermi and Drs. H. L. Anderson and Leo Szilard, of Columbia University, reported that by bombarding uranium with slow neutrons they obtain a 20% gain in the number of neutrons emitted. This is evidence—slight but probably real—that the splitting of uranium, with its enormous release of atomic power, is probably accompanied by a chain reaction that creates more neutrons to produce more uranium fissions, and so on. The whole question of atomic power is still in the balance for the experiments have yet to give a conclusive answer. The Columbia results are more conservative than reports which have come from French scientists studying this same matter.

Another new finding in uranium's splitting is the study by Drs. J. C. Mou-

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zon and R. D. Park of Duke University on the delayed emission of piercing gamma rays from uranium excited by neutrons. Taking Wilson cloud chamber photographs of the bombardment, the Duke scientists obtained, out of a great number, one highly interesting picture which may be the first evidence yet

found of a multiple fission of uranium.

Previously it has been shown that uranium can be split into two parts by neutron bombardment. The new Duke pictures may reveal a splitting into three or more different products instead of the usual two. More work will be needed to clear this important point.

Science News Letter, August 19, 1939

GEOLGY

Earthquake Records Show Mountains Have a "Keel"

Geological Society Also Learns of Submerged Falls And Glassy Layers Under Surface of the Earth

INTENSIVE studies of records of many California earthquakes have revealed the "keel" of the southern Sierra Nevada mountain range, Prof. Perry Byerly of the University of California told the Geological Society of America meeting at Berkeley, Calif.

One theory of geology, Prof. Byerly recalled, is that mountain ranges are masses of heavy rock "floating" in weak rock not unlike ships floating on the ocean. The new discoveries indicate that the mountain ranges have a keel.

Actually the keel seems to be a root of gigantic rock penetrating much deeper into the weak rock under the range than does the range itself. Bottom of the Sierra Nevada range appears to be at a depth of 20 miles. The keel goes down still farther.

Glassy Beneath Surface

FIFTY miles below the surface of the earth the ordinary crystalline structure of rocks gives way to a glassy condition, Profs. B. Gutenberg and C. F. Richter of California Institute of Technology told the geologists' meeting. Studies of

the records of earthquake vibrations have revealed this new knowledge.

Highly important to geology is the discovery for it has long been suggested that the earth consists of many concentric shells of different materials packed, one around another, like the layers in an onion.

"From all the evidence," Prof. Gutenberg said, "it may be calculated that certain physical properties change at a depth of about 50 miles. From other clues we conclude that this depth is probably that at which the crystalline structure of the rocks is replaced by a glassy condition."

Submerged Waterfalls Exist

REAT mud-laden "waterfalls" deep down in the ocean are pouring the sediment of California rivers into ocean bottom basins, Prof. F. P. Shepard of the University of Illinois told the meeting.

About 150 miles west of San Diego and far under water is a submerged 10,000-foot mountain whose slopes have been found to be absolutely bare of the sediments which one might expect to

RADIO

Capt. N. H. Heck, U. S. Coast and Geodetic Survey, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, August 28, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

find, Prof. Shepard said. Bare, too, are submarine canyons off the California coast out to depths of 5,000 feet. This raises the point of what happens to the tons upon tons of sediments borne to California rivers.

According to Prof. Shepard: "A large amount of the sand poured in by rivers is brought back by the waves which distribute it on the beaches while the bottom currents carry the mud out over the (continental) shelf into the deeper troughs and basins outside. The submarine canyons are kept clear of sediment largely by means of the great mud flows although currents are partly responsible."

Mountains Bring Sage-Brush

HE WIDE-SPREAD sage-brush of the Great Basin area of the far west probably got its start because the Sierra Nevada-Cascade mountain range rose up and blocked off moisture-bringing winds from the Pacific, Dr. Daniel I. Axelrod of the University of California told the geologists.

By a study of fossil plants he has been able to learn what plant life was like in the Late Pliocene era about 1,000,000 years ago.

About this time, Dr. Axelrod reported, a great change in the weather occurred in the west. On the northwest coast, over what is now Oregon and Washington, rainfall dropped from 25 inches yearly to the 13 inches it is today. And in southeastern California it fell from 12 inches yearly to the three inches of rain which now falls on the land.

The slow rise of the Sierra Nevada-Cascade mountains probably was the basic cause of this, Dr. Axelrod indicated. As they rose these ranges gradually intercepted more and more of the rain-bearing Pacific winds. Plants able to live in the increasingly drier climate prevailed. Sage-brush became king. A few of the Pliocene trees managed to survive—the pinyon pine, juniper, cottonwood and antelope brush—in Nevada. But generally they have continued to exist only in the mountains and on a few favorable sites bordering deserts.

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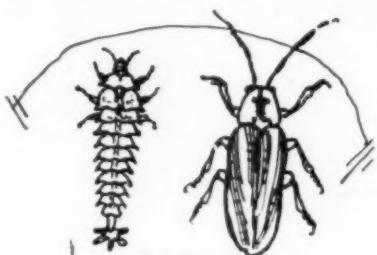
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Living Lanterns

HERE is no monopoly of luminescence among animals. Indeed, the property of shining in the dark extends even to the lower plants, for luminescent bacteria are rather common. But as one rises in the two scales of evolution, animal and plant, it is much more common to find shining animals than shining plants. There are luminescent worms, jelly-fishes, sponges, insects. Backboned animals, even, are represented, by fishes, especially certain forms that live in deep water.

Most numerous of all luminescent animals are the smallest and humblest of them, the one-celled forms in the great class protozoa. These at times fill the sea with such uncountable billions that the water seems to be turned into flowing fire, and the passage of a fish, or even a chance flung stone, looks like an inverted rocket-flight. By day, these same forms color the water brown.

Their terrific swarming numbers may use up all the oxygen surplus and cause serious upsets in the life-balance of the sea. Then they disappear as suddenly as they came. They multiply with incredible swiftness when the conditions are favorable; a slight change in even one necessary life-factor, like a temperature drop or a shortage of food, causes equally swift wholesale death.

These smallest and simplest of luminescent or phosphorescent animals give off light from their whole bodies, and so do some of the largest animals of the lower life-ranks. But the phosphorescent higher animals, especially the insects and fishes, usually have special light-giving parts or organs. Everybody knows how the luminous part of the firefly's body is placed aft and underneath, leaving the rest of the insect normally dark. Deep-sea fishes have luminous spots, some-

times in long lines like the portholes of a ship, sometimes on dangling appendages extending from the body.

Why do some animals shine thus in the dark? The question can hardly be answered with any confidence for the lowermost ones. If anything, it would seem that the light would be a disadvantage to them because it makes them conspicuous and therefore presumably easier prey for their larger hungry neighbors.

But luminescence has two very distinct lines of usefulness to some of the larger animals. It helps to get food, and it helps to get mates. Some of the fishes with luminous appendages dangle them over their mouths, like fish-baits over a landing-net. Smaller fish, attracted by these shining spots, swim directly into the waiting jaws.

And the fireflies use their shining bodies as veritable love-lanterns. In some species the males only fly; the females lurk in the grass as "glow-worms." The flashes back and forth tell each where the other is, and the prospective mates work out their little romance in a telegraphic lantern code.

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ENTOMOLOGY

Migrating Butterflies Marked for Identification

MARKING butterflies for identification when recaptured later on, as migrating birds are marked by numbered aluminum bands on their legs, is a new idea being tried out by Dr. Patrick H. Smyth of Montgomery, Ala. His experiment is being watched with interest by entomologists who have long been endeavoring to obtain more definite information about the great cloud flights of apparently migrating butterflies.

Dr. Smyth himself is not an entomologist. He is a meteorologist, who served the U. S. Weather Bureau for 44 years, 25 of them in Montgomery. He began to watch the annual flights of the common yellow sulfur butterfly in the summer of 1920, and has kept it up as a hobby ever since.

It was not until a year ago, however, that the idea of putting his name and address on the wings of yellow butterflies occurred to him. In a single season there was not much chance for definite returns, but he intends to keep it up and hopes that others, whether professional scientists or serious hobbyists like himself, will adopt the idea also.

There is no great trick to it, Dr.

Smyth states. He uses four compact rubber stamps, giving his name and address, with the date of capture and marking of the butterfly. Holding the insect gently against a piece of blotting paper with one hand, he presses the inked stamps lightly on each of its four wings, then lets it go.

It is not necessary, not even desirable, to use a net in capturing the butterflies, Dr. Smyth has found. At first he did net them, but discovered that they could be handled without risk of injury if one waited until they were on a flower, so intent on the business of feeding that human approach went unnoticed. Then he could pick them off with his fingers, almost as if they themselves were flowers.

The drift of migrating yellow butterflies in his locality is always toward the southeast, Dr. Smyth reports. Where they come from, and how far and fast they travel, remain mysteries which he hopes the stamped identification marks may help to unravel.

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CHEMISTRY

New Chemical Advances Include Fabrics From Fish

NEW advances in chemistry as gathered by the American Chemical Society are:

A Hungarian process makes seafood products out of freshwater fish by treating them chemically with various salts. These saturate the fish with the components of salty ocean water.

In Brazil, a special manufacturing process for producing castor oil on a large scale as a substitute for imported lubricating oil is under consideration.

Textile fibers are made out of fish skin by a new Italian method.

Soap nut, used since ancient times in India to wash woolen fabrics, silks and jewelry, contains the essential element saponin which is now employed in the manufacture of soapless shampoos.

Japan is making synthetic gasoline but at a cost of three times the market price of imported gasoline. Subsidies by the government make it possible.

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Naval Engineering

THE SHIPS AND AIRCRAFT OF THE U. S. FLEET—James C. Fahey, comp.—*Pub. by Compiler, 460 W. 34th Street, New York, N. Y.*, 47 p., 50c. A handy guide to the planes and ships of the U. S. Navy, well illustrated and more interestingly done than most such guides. However, in the aircraft section at least, the author has a tendency to give pretty high "unofficial" performance figures for some of the newer types.

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Agriculture

REPORT ON THE AGRICULTURAL EXPERIMENT STATIONS, 1938—U. S. Dept. of Agriculture—*Gov't. Print. Off.*, 199 p., 25c.

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Botany

CREEPING, SPRAWLING, CLIMBING PLANTS (Cornell Rural School Leaflet, Vol. XXXII, No. 4)—*Cornell University*—32 p., 10c.

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Education

THE RELATION OF VARIOUS ANTHROPOMETRIC MEASUREMENTS OF SELECTED COLLEGE WOMEN TO SUCCESS IN CERTAIN PHYSICAL ACTIVITIES—Elizabeth Beall—*Teachers College, Columbia Univ.*, 68 p., \$1.60. (Contributions to Education, No. 774) See p. 118.

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Public Health

WORKING TOGETHER FOR HEALTH AND SAFETY—J. Mace Andress, I. H. Goldberger and Grace T. Hallock—*Ginn*, 587 p., \$1.28. This unusually comprehensive hygiene textbook for children is interestingly written and should prove successful because of its emphasis on practical application of the lessons taught.

Science News Letter, August 19, 1939

Mathematics

MATHEMATICAL ANALYSIS FOR ECONOMISTS—R. G. D. Allen—*Macmillan*, 548 p., \$4.50. The mathematical methods described in this textbook in pure mathematics are illustrated by problems in economic theory. The volume is designed for elementary students and also as a reference book for economists.

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Medicine

THE PATIENT AS A PERSON—G. Canby Robinson—*The Commonwealth Fund*, 423 p., \$3. Brief case histories showing how the patient's home and economic circumstances affect his welfare, make

up the bulk of this interesting book. In other chapters Dr. Robinson describes the gap that often exists between the work of the doctor and that of the social worker, and tells about the system now being used at Johns Hopkins Medical School to bridge this gap and to teach future generations of doctors how to treat the patient as a whole.

Science News Letter, August 19, 1939

Psychology

THE MEASUREMENT OF ADULT INTELLIGENCE—David Wechsler—*Williams and Wilkins*, 229 p., \$3.50. The three parts of this book discuss the nature and classification of intelligence and describe the Bellevue Intelligence Scales, giving a history of their construction and standardization and a manual for use.

Science News Letter, August 19, 1939

Medicine

MALARIA EDUCATION—Elma Rood—*Rural Press*, 198 p., \$2. Facts about malaria control and practical advice on how to teach them to children and adults are given in this manual which should be extremely helpful to all concerned with health education.

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Hygiene

NUTRITION AND PHYSICAL FITNESS, 3d ed., rev.—L. Jean Bogert—*Saunders*, 602 p., \$3.

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Medicine

THE HARVEY LECTURES, Series XXXIV—*Harvey Society of New York—Williams & Wilkins*, 279 p., \$4. Technical lectures for scientific readers.

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Physical Education

SPORTS FOR THE HANDICAPPED—George T. Stafford—*Prentice-Hall*, 302 p., \$2.75. This book for physical educators and any others concerned with the education of handicapped children reveals an astounding number of games and other activities in which the handicapped can engage, with pleasure and benefit, and it should be extremely helpful. The author, associate professor of physical education at the University of Illinois, has had 20 years of experience in teaching handicapped individuals.

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Agriculture

LAND FACTS ON THE SOUTHERN PLAINS—Glenn K. Rule—*Gov't. Print. Off.*, 22 p., 30 c.

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Medicine

AMERICAN MEDICINE MOBILIZES—James Rorty—*Norton*, 358 p., \$3. An extremely interesting book giving the background of the present struggle for national health insurance. The author is in favor of health insurance, but he manages, without losing forcefulness, to be more moderate in tone than many who have written on this controversial subject.

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Child Study

STUDIES FROM THE CENTER FOR RESEARCH IN CHILD HEALTH AND DEVELOPMENT, SCHOOL OF PUBLIC HEALTH, HARVARD UNIVERSITY. I. THE CENTER, THE GROUP UNDER OBSERVATION, SOURCES OF INFORMATION, AND STUDIES IN PROGRESS—Harold C. Stuart and Staff, 261 p., \$1.75. II. TYPES, LEVELS, AND IRREGULARITIES OF RESPONSE TO A NURSERY SCHOOL SITUATION OF FORTY CHILDREN OBSERVED WITH SPECIAL REFERENCE TO THE HOME ENVIRONMENT—Eleanor Slater, Ruth Beckwith and Lucille Behnke, 148 p., \$1.25—*Society for Research in Child Development, National Research Council*.

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Anthropology

NUTRITION AND PHYSICAL DEGENERATION—Weston A. Price—*Hoeber*, 431 p., \$5. The author, a Cleveland dental surgeon, has investigated the customs of primitive peoples in many parts of the world and from his studies is convinced that many modern health problems could be overcome by more careful diet, particularly of mothers, not only before their children are born but before they even begin to have children.

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Economics

SOVIETS IN THE ARCTIC—T. A. Taracouzio—*Macmillan*, 563 p., \$7.50. A study of the Soviet penetration of the Arctic, published under the auspices of the Bureau of International Research of Harvard University and Radcliffe College. The Soviet program is considered: its centralization, planning far into the future, scientific, economic, political and legal aspects, its motivation and other aspects.

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Economics

BULLETIN OF THE NATIONAL ASSOCIATION OF WOOL MANUFACTURERS, Vol. LXVIII—*National Association of Wool Manufacturers*—642 p., \$2. A review of the wool industry's 1938 activities, including salient statistics.

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